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Multidimensionality in Developmental Conceptions Across Adulthood

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Abstract

Two studies demonstrate the usefulness of a newly developed, direct assessment method of subjective conceptualizations of development across adulthood. Results of Study 1 (N = 234, 18-83 yrs) suggest that older adults anticipate stronger decline in four domains of functioning (subjective well-being, social relations, cognition, physical functioning) than younger and middle-aged adults. Study 2 (N = 166, 20-85 yrs) showed that older adults' conceptualizations show less differentiation across domains than younger and middle-aged adults'. Results of both studies confirm lifespan notions of multidirectionality (expectations of gains *and* losses) but also show age-related differences in multidimensionality of developmental conceptions (i.e., differences in expected trajectories between domains). Moreover, results provide evidence that favorable conceptions impact perceived controllability and actual subjective well-being.

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Multidimensionality in Developmental Conceptions Across Adulthood

Expectations about one's future life are crucial for a variety of psychological outcomes, such as the perceptions of others, setting of goals, behavior, subjective well-being, and as a guideline for evaluating one's current state (e.g., Brandtstädter, 1989; Freund, 2007; Heckhausen, 1999). Subjective developmental conceptions reflect beliefs about developmental growth and decline in different functional domains. There is high social consensus that growth is more prevalent for younger ages and that decline becomes increasingly likely with advancing age (Heckhausen, Dixon, & Baltes, 1989). However, one of the central propositions of lifespan psychology (Baltes, 1987) states that development is multidirectional, i.e., entails gains as well as losses. Moreover, lifespan psychology holds that development is multidimensional, i.e., differs by functional domain (e.g., cognitive functioning, social relationships; Baltes, Staudinger, & Lindenberger, 2006). Are these propositions also reflected in subjective conceptions of adult developmental trajectories? Are subjective conceptions of developmental trajectories in terms of gains beneficial with regard to perceived controllability over developmental changes and current subjective well-being? In the presented research, we approach these questions using a newly developed multidimensional assessment of subjective developmental conceptions.

Subjective Developmental Conceptions Across Adulthood

Research on subjective developmental conceptions of gains and losses has mostly focused on the evaluation of personality characteristics across the lifespan (e.g., Fleeson & Heckhausen, 1997). For instance, a study by Heckhausen and colleagues (1989) found high social consensus regarding expectations of an age-related decrease in developmental gains and an increase in developmental losses. Heckhausen and colleagues used ratings of personal

characteristics such as skeptical or forgiving regarding the degree to which these characteristics are prominent across the lifespan, the desirability of these characteristics, as well as their onset and ending. Again using ratings of personality attributes, Heckhausen and Krueger (1993) compared the difference in the evaluation of oneself and for most other people across adulthood. They found the expectations of own versus others' development to be similar for younger age groups. However, older adults tended to judge other older adults' development less favorably than their own. Heckhausen and Krueger interpret this finding as reflecting self-enhancement, which they argue to become more important in old age when negative expectations threaten self-esteem and perceived control. Similarly, Heckhausen and Brim (1997) suggest that the positive discrepancy between evaluations of one's own compared to most others' development serves as a means for self-protection in older adults.

Recently, Grühn, Gilet, Studer, and Labouvie-Vief (2011) argued for a more domain-differential view in the investigation of change ascribed to personal characteristics across the lifespan (see also Gluth, Ebner, & Schmiedek, 2010; Kornadt & Rothermund, 2011b). Grühn and colleagues distinguished between the cognitive and physical domain and showed that, although negative profiles are present across the life span, negative cognitive characteristics are ascribed more often to young adults (e.g., naive) and negative *physical* characteristics are ascribed more often to old adults (e.g., sick). The most positive personality profile was ascribed to 60-69 year olds.

Note, that starting with the study by Heckhausen et al. (1989), with ~~a~~ very few exceptions ~~noted above~~ (Back & Bourque, 1970; Lang, Görlitz, & Seiwert, 1992) the vast majority of subsequent studies have used the approach of analyzing ratings of personality attributes. Although this approach provides valuable insights into subjective developmental conceptions, it

does not allow assessing functional trajectories in different life domains but instead demonstrates the overall desirability of attributes characterizing members of different age groups. Moreover, interpreting the onsets and endings of possessing certain characteristics as gains or losses, is not always straightforward. For instance, the onset of being cautious or queer in middle adulthood, does not necessarily imply or predict a developmental *gain* or a *loss*, even though these attributes were rated as rather socially desirable or socially undesirable in the Heckhausen et al. study (1989, Table 1). Thus, when interested in conceptions of gains and losses across adulthood, a more direct and comprehensive assessment seems more adequate.

In the current research, we therefore included a more straightforward measure of subjective developmental conceptions, i.e., conceptions of gains, loss, and stability across four life domains and for the three life stages of young, middle, and older adulthood. The inclusion of perceptions of development across different life domains (subjective well-being, social relations, cognition, physical functioning) is in particular important as it allows investigating perceived multidimensionality of development. In line with both, age-related stereotypes (e.g., Hummert, Garstka, Shaner, & Strahm, 1994) and multidimensionality in development (e.g., Baltes & Smith, 2003), loss conceptualizations for older adulthood should be more prominent in the domains of physical and cognitive functioning. In contrast to these decline trajectories, research suggests that the quality of and satisfaction with social relationships improves with age (e.g., Carstensen, Isaacowitz, & Charles, 1999; Lang, 2001). Similarly, indicators of subjective well-being show stability or even improvement into old (but not necessarily into very old) age (e.g., Kunzmann, Little, & Smith, 2000; Röcke & Lachmann, 2008)[1]. If subjective conceptions reflect these documented developmental trajectories, subjective conceptions of development in

subjective well-being should also be predominantly stable or even show growth into old adulthood.[1]

Implications of Subjective Developmental Conceptions

Anticipated Decline and Perceived Controllability

Advertisements of cosmetics, gyms, or "brain jogging" programs suggest that people can change the course of aging by investing resources into these domains of functioning. Perceiving oneself as able to change developmental trajectories in a desired way might have an impact on the effect of expected age-related changes on self-reported subjective well-being. Note, that here we refer to subjective well-being as an outcome of developmental processes very much in the tradition of the literature on successful development (e.g., Freund & Riediger, 2003).

Brandtstädter (1989) argues that perceived controllability over developmental changes plays a major role for maintaining optimism about one's future life when facing losses. Moreover, perceived controllability of developmental trajectories might be one of the central factors determining how people react to age-related changes behaviorally, cognitively, and emotionally. When losses or decline are perceived as controllable, people are more likely to engage in behaviors that are aimed at counteracting losses. In contrast, when losses or decline are perceived as uncontrollable, lowering one's goals and expectations can bolster subjective well-being (Heckhausen, Wrosch & Schulz, 2010). As of yet, however, the empirical literature on the relationship between expected change and perceived controllability is surprisingly scarce (but see Heckhausen, 1990; Heckhausen & Krueger, 1993; Lang & Heckhausen, 2001)

Ideal and Age Group Developmental Conceptions And Their Implications for Subjective Well-Being

There is some empirical evidence that positive views on aging affect life satisfaction and well-being (e.g., Kornadt & Rothermund, 2012b, Mock & Eibach, in press) and even mortality (Levy, Slade, Zonderman & Ferruci, 2009). Note, however, that these studies mostly assessed the endorsement of stereotypic statements about age. Thus, these approaches confound general views on aging with views on one's personal development. Views on personal trajectories and views on others' development might diverge (Weiss & Lang, 2012) and should be differentially related to subjective well-being. For instance, views on my personal development might affect my current well-being more than views on general trajectories. Moreover, when expecting worse developmental outcomes for oneself compared to an ideal or age group's developmental trajectory, subjective well-being should suffer.

Interestingly, the discrepancy between actual and ideal development seems to decrease with age (Ryff, 1991; Staudinger, Bluck, & Herzberg, 2003). Self-ideal similarities as well as favorable comparisons of oneself to most other people (Heckhausen & Krueger, 1993) are both hypothesized to contribute to subjective well-being in older ages. However, the association between these comparisons with regard to developmental conceptions and subjective well-being has not yet been investigated empirically. We expect that, the closer expectations for self and ideal development (self-ideal) are, the higher should be a person's subjective well-being. Contrasting one's own developmental trajectories away from negative age-related expectations for other people (self-age group) should positively contribute to subjective well-being.

Multidimensionality in Subjective Developmental Conceptions Across Adulthood

There is evidence that older adults are more sensitive to variability and dynamics in their developmental trajectories across the lifespan, especially in the domain of subjective well-being (Röcke & Lachmann, 2008; Ryff, 1991). Older adults also perceive the onset as well as ending

period of change in a more differentiated and elaborated manner than younger and middle-aged adults (Heckhausen, 1990). On the basis of these findings, one could hypothesize that older adults differentiate more than younger age-groups between development in different functional domains. However, one could also argue for the opposite hypothesis that older adults are more likely to see the interconnection of different domains and conceptualize developmental trajectories as less multidimensional. This might be the case because, in contrast to younger age groups, older adults might have either experienced themselves or observed in others, that different domains are highly interconnected. For instance, to some degree good physical and cognitive functioning facilitate social relations and contribute to subjective well-being (Kunzmann, 2008). Higher levels of cognitive and physical functioning facilitate participation in daily activities such as outdoors hobbies or meeting other people that contribute to subjective well-being. As the perception of domain-interrelatedness might be a function of life experience, multidimensionality in subjective conceptions of developmental trajectories might *decrease* with increasing age.

The Current Studies

The presented research assessed the multidimensionality in subjective developmental conceptions. In Study 1, we expected to replicate that younger adults expect predominantly gains, whereas older adults should expect losses. Still, we expected domain differences across age groups with regard to gain and loss expectations. We further expected that positive views on development are associated with an increase of perceptions of controllability. In Study 2 we additionally contrasted the personal conceptions against the perceived age groups' and ideal developmental trajectories to account for general stereotypes of aging and wishes regarding personal development. We then aimed to test whether personal, perceived age group's, and ideal

trajectories are conceptualized more or less domain-differentially with increasing age. Finally, conceptions favoring one's own compared to others' developmental trajectories were expected to predict current life satisfaction as well as subjective health.

Study 1

Method

Procedure

Participants were recruited via postings on various webpages (e.g., seniorweb.ch, marktplatz.uzh.ch) in German speaking countries (Switzerland, Germany, Austria). They logged on to an online-questionnaire that started with an informed consent form. After agreeing to participate in the study, participants filled out a brief demographic questionnaire. They then reported their subjective age-conceptions, affective well-being and perceived control. As a way of reimbursing participants, we raffled 50 vouchers worth 15 Euro/20 CHF (approximately 20 US-Dollars) for Amazon.de.

Sample

The sample was comprised of $N = 234$ younger ($n = 128$; 74% women, 18-30 years, $M_{age} = 23.47$, $SD = 2.88$), middle-aged ($n = 57$; 81% women; 40-50 years, $M_{age} = 45.18$, $SD = 3.27$) and older adults ($n = 49$; 49% women, 60-83 years, $M_{age} = 67.53$, $SD = 4.9$). Overall, the sample was well educated, with 74% of the younger, 53% of the middle-aged and 63% of the older adults holding at least a high school diploma.

Measures

Subjective developmental conceptions. Participants were asked to imagine what it meant, for them personally, to function at 100% in a given domain (subjective well-being, cognitive functioning, physical functioning, social relations). They were asked to write down a

keyword that represented 100% functioning within each domain. Participants were then asked to assess their personal level of functioning for each domain on a 0 to 100% scale (1) *now* and (2) *in 10 years* (a) *with* and (b) *without* effort investment. The instruction regarding the developmental trajectory with the additional investment of effort (here for cognitive functioning) read: *"Please imagine yourself investing much more effort than you invest at the moment in your cognitive functioning. What would your level of functioning be then?*" Figure 1 depicts perceived developmental conceptions for the three age groups and four domains.

In order to compute **expectations of growth and decline**, we subtracted the ratings of functioning *now* from the level of *functioning in 10 years* in each domain. This score represents the degree of growth (positive scores) or decline (negative scores) that people expect in the next 10 years while holding the current level of functioning stable. Next, we subtracted the level of functioning in 10 years *without* further resource investment from the level of functioning *with* more resource investment. This difference score reflects **perceived controllability** over future growth or decline (the higher the score, the more perceived controllability, Figure 2 depicts perceived controllability for the three age groups and four domains).

General perceived control was assessed using the *Control Scales* (*personal mastery* and *perceived constraints* subscales; Lachman & Frith, 2004) that is comprised of 12 items (e.g., "I have control over the things that happen to me."). Reliability of the composite score was good (α = .89). There were no age-differences in perceived control ($F(2, 231) = 1.33$, $p = .27$)

Results

All of the following analyses of variance were run with gender and education as additional between subject factors to test for possible interactions with age. As none of the

effects with gender and education reached significance, all final analyses were run across women and men as well as across educational levels.

Multidimensionality of Subjective Developmental Conceptions

A repeated measures analysis of variance tested whether developmental conceptions differ across domains of functioning (i.e., are represented multidimensionally) with domain as a within-participants factor and age group as a between-participants factor. The 4 (domain: subjective well-being, cognition, physical functioning, social relations) x 3 (age group: young, middle-aged, older) repeated measures ANOVA evinced significant main effects for domain ($F(3, 664) = 9.25$, $p < .001$, $\eta^2 = .11$) and age group ($F(2, 227) = 58.51$, $p < .001$, $\eta^2 = .34$). The interaction was not significant ($F(6, 664) = 1.35$, $p = .23$, $1\text{-}\beta = .52$). Follow-up comparisons using Scheffé test revealed significant differences in expectations of growth and decline between all age groups ($M_{younger} = 8.97$, $SD = 8.64$, $M_{middle\text{-}aged} = 4.76$, $SD = 10.83$, $M_{older} = 7.35$, $SD = 6.95$, *all ps* $< .05$; see Figure 1). These results replicate previous findings: Older adults expected decline whereas middle-aged and younger adults expected gains over the course of the next 10 years. Older adults expected losses across all functional domains. However, all age groups expected the least decline in the domain of subjective well-being. Paired comparisons of domain effects evinced significant differences between the expectations for subjective well-being and social relations ($t(283) = 3.88$, $p < .001$), subjective well-being and cognitive functioning ($t(288) = 4.5$, $p < .001$), and subjective well-being and physical functioning ($t(286) = 5.67$, $p < 0.01$). All other domain comparisons were not significant (all *t*s: $-.75 \leq t(281 < df < 284) \leq 1.85$, all $ps \geq .24$). The results suggest that developmental conceptions are represented multidimensionally. Across age-groups, least decline is conceptualized in the domain of subjective well-being.

Subjective Developmental Conceptions and Perceived Controllability

Regression analyses tested if anticipated change in development was associated with perceived domain-specific controllability on development. In the first step, perceived controllability was regressed on age, gender, education, general perceived control, and perceived domain-specific change. As shown in Table 1, age was negatively associated with perceived controllability of development in the domains of social relations and physical functioning. Perceived change in the domain of subjective well-being (measured as perceived functioning in well-being in 10 years compared to now) emerged as the strongest predictor of controllability in all four life domains. We also tested for possible interaction effects of age x perceived domain specific change in predicting perceived controllability. With one exception, none of the interactions reached significance (all *t*s: $-1.75 \leq t(246) \leq 1.74$, all *p*s $\geq .08$). The exception concerned the interaction of age x perceived change in cognition in the prediction of perceived controllability of change in cognitive functioning ($\beta = -.18$, $t(246) = -2.10$, $p = .04$).

In sum, results of Study 1 confirm and extend prior research regarding expectations of developmental losses in older adulthood. In line with theory and empirical results concerning emotional development (e.g., Carstensen, Isaacowitz, & Charles, 1999), less negative expectations were found for subjective well-being across all three age groups. Conforming to the literature on control (e.g., Heckhausen, 1999), younger adults perceived more controllability of their development than middle-aged and older adults. Growth conceptions in subjective well-being were associated with an increase in perceived controllability across all life domains.

Study 2

Building on and extending Study 1, Study 2 included expectations for self, ideal developmental conceptions, and general age-related expectations in four life domains (subjective

well-being, social relations, cognition, physical functioning). Further, Study 2 tested for possible implications of conceptions on actual subjective well-being.

Method

Procedure

Participants were recruited from Switzerland, Germany, and Austria by web-postings and through a participant pool of our laboratory. Paper-pencil questionnaires were sent to participants via mail. After providing informed consent, participants filled out a brief demographic questionnaire as well as measures of life satisfaction and subjective health. Then, subjective developmental conceptions were assessed (see below). Participation in this study was reimbursed by entering a lottery for an iPhone 4.

Sample

The sample consisted of $N = 165$ younger ($n = 78$; 77% women, 20-40 years, $M_{age} = 25.23$, $SD = 4.12$), middle-aged ($n = 52$; 58% women, 41-60 years, $M_{age} = 48.15$, $SD = 4.84$) and older adults ($n = 35$; 57% women, 61-85 years, $M_{age} = 69.86$, $SD = 6.25$). One participant was excluded because the drawings of expected developmental trajectories could not be coded. Six participants (3 younger, 1 middle-aged and 2 older participants) were excluded because they returned the questionnaire without providing informed consent. 39.7% of the younger, 56.9% of the middle-aged and 25.7% of the older adults held the degree of the highest school track possible in German speaking countries (Abitur).

Measures

Subjective Developmental Conceptions. Using a new way of assessing subjective conceptions of developmental trajectories via graphical representation (for a similar approach see Lang, Görlitz, & Seiwert, 1992), we conducted a small pilot study with six participants (three

older, three younger participants) to ensure the face validity of the study. We tested whether the instructions were understandable and could be followed by adults of different ages. Participants were introduced to a detailed example on how development across time can be visualized using lines (ascending, descending, parallel). All pilot participants were able to follow the instructions and were able to explain the meaning of ascending (growth), flat (stability), and descending lines (loss). More specifically, participants were instructed to draw their subjective age-conceptions in an axis of abscissas using ascending, flat, or descending lines. The abscissa indicated age. In order to avoid confusion when young adulthood, middle-age and older adulthood might start and end, the graphs depicted young adulthood as ranging from 18 to 30 years, middle adulthood from 45 to 55 years, and older adulthood from 65 years and older. The ordinate signified the subjectively expected level of growth or decline in functioning (ranging from -100% to +100%). The line drawn by participants was to symbolize the subjective developmental trajectory (see Back & Bourque, 1970, for a similar assessment method). This allowed participants to provide expectations of growth (positive slope), decline (negative slope) and stability (flat line). Participants were asked to draw developmental trajectories in the four domains also used in Study 1 (subjective well-being, cognitive functioning, physical functioning, social relations), using three different perspectives (self, own age group, ideal). Each of the subjective age-conceptions was drawn into a single axis of abscissas, resulting in a total of 12 trajectories. A detailed description of the study instructions is provided in Appendix A.

The subjective conception of growth and decline was operationalized as the slope in each life stage. Three independent raters rated the degree of the slope on a scale from -3 (strong decline) to 0 (stability) to +3 (strong increase). Interrater reliabilities were sufficiently high (all

intraclass correlations > .78) to treat the mean of the rated slopes as the dependent variable. Figures 2, 3 and 4 depict mean slope values for the 12 trajectories.

Self-age group comparisons As a measure of self-age group comparisons we subtracted the slope participants drew for their age group from the slope they drew for their own development for each life stage and domain (see Appendix B). Positive values indicate that participants assessed their own development as more favorable than their age group's development, zero indicates no difference between the conceptions; negative values indicate that participants assessed their age group's development as better compared to their own.

Self-ideal comparisons. Similarly, as a measure of self-ideal comparisons we subtracted the slope participants indicated as their ideal development from the slope they drew for their own development (see Appendix B). Again, positive values indicate that participants assessed their own development as better than their ideal development; negative values indicate that participants assessed their ideal development as better compared to their own development.

Actual subjective well-being was operationalized via two facets, namely a single-item measure of life satisfaction ("Overall, how content are you with your life?") and a single-item measure of subjective health ("Overall, how good is your health?"). There were significant age-related differences in life satisfaction but not in subjective health (life satisfaction: $F(2, 165) = 6.87$, $p < .001$, $\eta^2 = .08$; health: $F(2,165) = 2.41$, *n.s.*). Younger ($M = 4.47$, $SD = 1.12$) and middle-aged adults ($M = 4.66$, $SD = 1.22$) were significantly less satisfied with their lives than older adults ($M = 5.29$, $SD = .67$).

Results

Analyses of variance were run to test for systematic interactions of gender and education with age. As no relevant effect reached significance analyses were run across gender and

educational levels. Repeated-measures ANOVAs tested age group (young, middle-aged, older) and domain (subjective well-being, cognition, physical functioning, social relations) differences in personal conceptions, self-age group, and self-ideal comparisons. Finally, multiple regression analyses were used to test whether participants who view themselves more positively than their age group or rate their own development as similar to the ideal development also exhibit higher actual subjective well-being.

Repeated-measures analyses of variance were conducted to test whether developmental conceptions are multidimensional with regard to domains of functioning, comparisons (self, ideal, age-group), and life stage. Domains of functioning, comparisons, and life stages constituted within-participants factors, age group a between-participants factor. A 4 (domain: subjective well-being, cognition, physical functioning, social relations) x 2 (comparison: self-ideal, self-age group) x 3 (evaluated life stage: young, middle-aged, older) x 3 (age group: young, middle-aged, older) repeated measures ANOVA revealed significant main effects for domain ($F(3, 403) = 11.58$, $p < .001$, $\eta^2 = .07$), comparison ($F(1, 141) = 121.03$, $p < .001$, $\eta^2 = .46$), evaluated life stage ($F(2, 274) = 18.50$, $p < .001$, $\eta^2 = .12$), and age group ($F(2, 141) = 6.40$, $p = .002$, $\eta^2 = .08$). The two way interactions of comparison x domain ($F(3, 405) = 10.25$, $p < .001$, $\eta^2 = .07$), domain x age group ($F(6, 402) = 2.45$, $p = .02$, $\eta^2 = .03$), life stage x age group ($F(4, 273) = 7.31$, $p < .001$, $\eta^2 = .09$), and life stage x domain $F(5, 714) = 8.37$, $p < .001$, $\eta^2 = .06$) were significant. The three-way interactions of age group x domain x comparison ($F(6, 613) = 2.24$, $p = .04$, $\eta^2 = .03$) and of domain x life stage x comparison ($F(10, 613) = 18.26$, $p < .001$, $\eta^2 = .04$) were significant, but not the interaction of domain x life stage x age group ($F(12, 613) = 1.46$, *n.s.*, 1- $\beta = .78$). The four way interaction was not significant ($F(10, 613) = 1.4$, *n.s.*, 1- $\beta = .72$). Below, we will report the follow-up comparisons related to the two-way

domain x age group as well as the three-way interactions. All paired domain comparisons appear in Table 2. Means and confidence intervals are summarized in Figure 3, 4, and 5. Means and confidence intervals of the difference scores are depicted in Appendix B.

Multidimensionality of Subjective Developmental Conceptions

Indicating a high level of differentiation regarding the conceptualization of developmental trajectories in different functional domains, all domain-comparisons for younger and middle-aged adults were significant (paired T-Tests; all *t*s: $-3.05 \geq (52, 76, 77) \leq 2.43$; all *p*s $< .001$). There is only one exception of this pattern for each of the two age-groups of young and middle-aged adults (young adults hold the same developmental conceptualizations for subjective well-being and social relations: $t(76) = 1.43$, $p = .15$; middle-aged adults' developmental conceptualizations do not differ for social relations and cognition: $t(52) = -.96$, $p = .34$). Older adults' subjective conceptualizations show less domain differentiation, indicating a decrease in multidimensionality. Whereas physical functioning was perceived to take a different developmental trajectory than social relations, subjective well-being, and cognitive functioning, (all *t*s: $-2.40 \geq t\ (34) \geq 2.44$; all *p*s $\leq .02$), subjective developmental trajectories did not differ between all other domains (all *t*s: $-.73 \leq t(34) \leq -.21$; all *p*s $\geq .47$). These results indicate a high level of differentiation regarding the conceptualization of subjective developmental trajectories in different functional domains in younger and a decrease of multidimensionality in older adults.

Multidimensionality of Self-Age Group Comparisons

Indicating multidimensionality in self-age group comparisons, the 4 (domain: subjective well-being, cognition, physical functioning, social relations) x 3 (age group: young, middle-aged, older) repeated measures ANOVA evinced a significant main effect for domain ($F(3, 456) =$

8.33, $p < .001$, $\eta^2 = .05$). There was no main effect of age group ($F(2,160) = 1.19$, $p = .30$, 1- β = .26) and no age group x domain interaction ($F(6, 456) = .97$, $p = .44$, 1- $\beta = .37$).

Domain differences. Across age groups, the largest self-age group differences were perceived for subjective well-being ($M = .22$, $SD = .83$) with significant difference to all other domains (ts: $-4.29 \leq t(163 \leq df \leq 165) \geq 3.78$, all ps $< .05$). Self-age group comparisons differed for social relations and physical functioning ($t(163) = 2.35$; $p < .05$). All other domain comparison were not significant (ts: $-1.32 \leq t(162 \leq df \leq 164) \leq .44$, all ps $\geq .19$).

Multidimensionality of Self-Ideal Comparisons

A 4 (domain: subjective well-being, cognition, physical functioning, social relations) x 3 (age group: young, middle-aged, older) repeated measures ANOVA evinced significant main effects for domain ($F(3, 466) = 18.13$, $p < .001$, $\eta^2 = .10$) and age group ($F(2, 159) = 11.30$, $p < .001$, $\eta^2 = .12$), and an age group x domain interaction ($F(6, 466) = 2.78$, $p = .01$, $\eta^2 = .03$).

Age-related differences. Scheffé-Tests revealed that middle-aged and older adults perceived their ideal development across all domains to be more similar to their own development than younger adults ($M_{young} = -.65$, $SD = .52$; $M_{middle\text{-}aged} = -.39$, $SD = .36$; $M_{older} = -.22$, $SD = .41$; both $ps < .05$). There was no significant difference between middle-aged and older adults ($p \geq .24$).

Domain differences. For younger adults, paired T-Tests revealed *no* significant difference between the perceived developmental difference between self and ideal in the domains of subjective well-being ($M = -.40$, $SD = .85$; $t(76) = -.71$, $p \geq .48$) and social relations ($M = -.33$, $SD = .61$). However, all other domains differed significantly from each other (all ts: $4.5 \leq t(76 \leq df \leq 77) \leq -2.18$; all ps $< .001$). Middle-aged adults perceived the self-ideal difference in cognition ($M = -.71$, $SD = .64$) significantly larger than the self-ideal difference in subjective

well-being (M = -.26, SD = .58), social relations (M = -.26, SD = .64), and physical functioning (M = -.34, SD = .66; all ts($50 \leq df \leq 52$) $\leq$ -3.46; all ps < .001). The self-ideal differences in the domains of subjective well-being, social relations and physical functioning did not differ from each other (all ts: -.24 $\leq t(50 \leq df \leq 52) \leq$ .42, all ps > .5). For older adults, the self-ideal difference in cognitive functioning (M = .42, SD = .67) was perceived as more pronounced than in the domain of physical functioning (M = -.15, SD = .53; t(34) = -2.32, p < .05). The self-ideal differences in the other domains did not differ from each other (all ts: -1.73 $\leq t(33 \leq df \leq 34) \leq$ .13; all ps $\geq$ .09). The results reveal a decrease in multidimensionality of self-ideal comparisons across adulthood. Across age groups, the largest differences between self and ideal development were perceived in the domain of cognition.

Self-Age Group Comparisons and Self-Ideal Comparisons as Predictors of Life Satisfaction and Subjective Health

Using multiple regression analyses, we predicted life satisfaction and subjective health with the self-age group comparison and the self-ideal comparison separately for each life stage and for each life domain. Chronological age of participants was positively associated with life satisfaction (β = .12, t(111) = 3.95, p < .001) and with subjective health (β = .09, t(111) = 2.77, p = .007). Participants who judged the development of the age group as *worse* than their own development in the domain of cognition in the life stage of younger adulthood reported *better* subjective health (β = .13, t(111) = 2.62, p = .01). Similarly, participants who judged the development of the age group as *worse* than their own development in the domain of social relations in the life stage of middle adulthood reported *better* life satisfaction (β = .09, t(111) = 2.33, p = .02).

Similarly, favorable self-ideal comparisons in the domain of subjective well-being contributed significantly to subjective health (β = .12, $t(111) = 2.83$, $p < .01$). Self-ideal comparisons and self-age group comparisons in the other life domains were unrelated to life satisfaction (all *t*s: $-1.36 \leq t(111) \leq 1.35$, all *p*s $\geq .05$) and subjective health (all *t*s: $-1.37 \leq t(111) \leq 1.06$, all *p*s $\geq .17$).

Discussion

The present research investigated the multidimensionality of developmental trajectories across adulthood and their implications for perceived controllability and current levels of subjective well-being. The studies demonstrate the usefulness of a newly developed measure of subjective conceptualization of developmental trajectories. Four important results emerged from the two current studies: Confirming lifespan theoretical assumptions, subjective conceptualizations of development are (1) multidirectional (i.e., comprise gains *and* losses), (2) multidimensional (i.e., reflect differences between developmental conceptualizations in functional domains), (3) Expected developmental growth in subjective well-being is associated with higher perceived controllability in these domains (even after controlling for general control beliefs), (4) favorable self-age group and self-ideal comparisons are beneficial in terms of self-reported, current subjective-well-being.

Limitations. Before discussing the results in more detail, we would like to point to some limitations that constrain the interpretation of the results. First, both studies investigated four functional life domains (subjective well-being, social, cognitive, physical) and developmental conceptions might be different in other life domains. Additionally, several social cognitive issues have to be considered when interpreting our data. Individuals differ in their representation of time (Cottle, 1976), and time is an age-sensitive construct (Thomae, 1989). That is, predicting

development into the next 10 years might represent a rather short future time period for younger adults but an extended future time perspective in older adults (Lang & Carstensen, 2002). In addition, the evaluation of one's past development (e.g., older adults' subjective conception of their developmental trajectory during young or middle adulthood) might depend on the actual time distance, leading to stronger memory biases for the distant compared to the more immediate past (Wilson & Ross, 2001). Moreover, memory processes might differ between age groups. As aging seems to affect memories of emotional content less than other contents (e.g., Carstensen & Turk-Charles, 1994), older adults might remember highly emotionally charged developmental changes more accurately than less subjectively important domains. Note, however, that we were interested in the *subjective* conceptions and not in actual development. In our view, memory biases are a part of the phenomenon.

Another limitation concerns the design. Both studies are based on cross-sectional designs, confounding age with cohort effects (Schaie, 1965). Additionally, the first study was based on an online assessment. This might be somewhat problematic when measures are assessed that are highly sensitive to distraction (e.g., cognitive measures involving speed). In the case of Study 1, however, this was not the case. In general, internet studies do not seem to differ regarding the reliability of the results and replicate laboratory findings (Birnbaum, 2004; Reips, 2001). Note also that findings from Study 2, a paper-and-pencil test, converge with results from Study 1. Another limitation refers to the relatively high level of education in our samples and the fact that our sample is positively biased with regard to their ratings of subjective health. Note, however, that controlling for education did not change the results. Clearly, representative samples are best suited for investigating normative expectations. Unfortunately, however, the recruitment of representative samples as well the implementation of longitudinal studies is as

difficult as it is desirable. In addition, we were primarily interested in age-related differences in the multidimensionality, multidirectionality, and the functions of subjective developmental conceptions rather than in the description of developmental conceptions in the general population.

The present studies do not differentiate developmental conceptions of the third and the fourth age or, in other words, the group of "old" compared to the group of the "very old" (65 to 80 years, 80 to 100+ years). As pointed out by Baltes and Smith (2003), the fourth age might show substantially more decline in various domains of functioning compared to the third age. Moreover, there is some evidence for terminal decline in functioning some time before death (e.g., Wilson, Beck, Bienias, & Bennett, 2007). Whether or not the differentiation between old and very old age or the notion of terminal decline are also reflected in subjective developmental conceptualizations is very interesting and awaits further empirical investigation. One could easily use our graph methodology and ask participants to draw developmental trajectories starting with the time from death instead of time from birth. Similarly, it would have been interesting to differentiate between the developmental conceptions of old and very old adults. Unfortunately, our studies did not allow such analyses as only few participants were older than 80 in the two studies

Another critical issue in the current studies lies in the selection of life domains for which participants provided their subjective developmental conceptions. We selected life domains that are equally important across age groups and that represent fundamental domains of functioning that are not highly interrelated in order to avoid a confound in the conceptions of development in different life domains. Thus, we assume that the inclusion of other and more domains might have led to different results, possibly higher convergence between the developmental

conceptualizations across life domains. For instance, the domain of leisure/hobbies is likely related to both social relationships (as many leisure activities are done together with friends or family) and physical functioning (as a large part of leisure activities involve physical activities such as hiking or dancing). The interrelation of these domains, then, might have led to an underestimation of multidimensionality because functioning in one domain (e.g., health) might constitute a necessary condition to engage in the other domain (e.g., hobbies such as hiking). Additionally, one could argue that the domains of functioning included in the present studies differ regarding the level of concreteness. Specifically, the domain of subjective well-being might be less concrete than the domain of social relationships. Although subjective well-being is often used in the aging research as a subjective indicator of successful development (Freund & Riediger, 2003), subjective well-being is also subject to development and people hold expectations about its trajectory. In fact, many people name abstract projects such as subjective well-being as one of their personal goals on the same level as social relations or health (Little, 1999). Thus, in the current context, we included subjective well-being as one of the domains for which we assessed subjective developmental conceptions.

Developmental conceptualizations in the domain of subjective well-being. Both studies emphasize the role of the domain of subjective well-being in multidimensionality and the implications of developmental conceptions. First, results of Study 1 showed that, compared to younger adults, older adults conceptualized their future development more negatively. However, there were domain-related differences such that all age groups expected the most positive developmental trajectory for subjective well-being. Adding to these positive expectations regarding the development of subjective well-being, Study 2 showed that all age groups perceive their development as superior to their *age group*. Moreover, for the domain of subjective well-

being, self-age group discrepancies were perceived to increase and self-ideal discrepancies to decrease across adulthood. As elaborated in the introduction, expectations about development have multiple functions for the setting and pursuit of goals and as standards of comparison (e.g., Freund, 2007). As research in the area of social comparisons demonstrates, downward comparisons mostly help to increase subjective well-being (e.g., Buunk, Collins, Taylor, VanYperen, & Dakof, 1990; Heckhausen & Krueger, 1993).

Generally, middle-aged and older adults seem to become more satisfied with their lives, operationalized as a higher similarity between one's own and the ideal development across different life domains. These results support previous research showing that individuals who enter old age adopt more positive views of characteristics associated with older adults (Hummert et al., 1994; Rothbaum, 1983) and perceive a greater fit between ideal and self assessments (Ryff, 1991). These findings are validated by the result that self-ideal discrepancies in subjective well-being contribute to life satisfaction and subjective health. Future research needs to address the possible interplay of conceptions of ideal and one's age-group's development as standards of comparison for setting future levels of aspirations or for evaluating one's actual level of functioning.

Developmental conceptions in the domain of subjective well-being seem to affect the perception of controllability of one's life. The results indicated that developmental conceptions of subjective well-being are tied closer to perceptions of controllability than developmental conceptions in other domains. More concretely, adults who expected gains in subjective well-being over time, also expected to have more control on their own development in cognitive and physical functioning, social relations, and subjective well-being. Expecting to feel better, then, might boost adults' views or hopes of themselves as producers of their own development.

Increasing levels of current subjective well-being might also lead to a general optimistic perception of one's own impact on development.

Due to the correlational nature of the data, the reverse interpretation is also possible. People who show higher control beliefs in various life domains might be more likely to expect that subjective well-being increases over the course of development. Importantly, the data showed that positive views on development and control beliefs are intertwined, and that impairments in perceived controllability might lead to decrements in positive views on development and vice versa. Pointing to the mechanisms within this association, Rothermund and Brandtstädter (2003) showed, that the flexible adjustment of goals buffers the impact of loss of control on satisfaction with performance by older adults in certain domains (see also Brandtstädter & Rothermund, 1994).

Growth conceptions. Results from Study 2 suggest that growth conceptions might stimulate positive feelings about one's life and health. Again, the opposite causal direction might also be true: People who feel healthy and content might adopt growth conceptions of their own future. Note, however, that Wurm, Tomasik, and Tesch-Römer (2010) showed that the effect of subjective developmental conceptions on health is stronger than the effect of health on subjective conceptualizations. Further longitudinal or experimental research is needed to address this question.

The present studies provide strong evidence for multidimensionality in the subjective conceptions of development across age groups. We also found systematic age-differences as older adults seem to differentiate less between functional domains when they compare their own development with that of their ideals. We have hypothesized that older adults conceptualize development less multidimensionally because they might have experienced the actual

connectedness of functioning in different life domains (e.g., physical health facilitates getting together with friends and might, thereby, contribute to social relations). An alternative interpretation of this result is based on cognitive representations in older adulthood. Older adults might have a less detailed and hence broader categorization and representation of different functional domains which might efficient information processing (Luo & Craik, 2009). Note, however, that Hummert and colleagues (1994) found that older adults hold a more differentiated view of subgroups of older adults than younger adults. This makes the first interpretation (acknowledgment of the interconnectedness of functional domains) more likely.

In sum, then, the current studies underscore the importance of a differentiated assessment of subjective conceptualizations of development across adulthood and their implications for perceived controllability and current life satisfaction as well as subjective health. Future longitudinal studies need to address the impact of these conceptualizations as guides for development.

Footnotes

1 - A further rationale guiding the selection of life domains was that domains should be important across age groups in order to ensure that ratings reflect expected developmental trajectories instead of ratings of importance. Thus, for example, education or career were excluded as life domains. Moreover, our selection of life domains was based on empirical findings in the literature such that two of the domains are associated with decline across adulthood (cognitive and physical functioning) and two domains that are associated with growth (functioning in social relationships and subjective well-being).

References

Back, K. W., & Bourque, L. B. (1970). Life graphs: aging and cohort effect. *Journal of Gerontology, 25*, 249-255. doi: 10.1093/geronj/25.3.249

Baltes, P. B. (1987). Theoretical propositions of life-span developmental psychology: On the dynamics between growth and decline. *Developmental Psychology, 23*, 611-626. doi: 10.1037/0012-1649.23.611

Baltes, P. B., & Smith, J. (2003). New frontiers in the future of aging: from successful aging of the young old to the dilemmas of the fourth age. *Gerontology, 49*, 123-135. doi: 10.1159/00006794

Birnbaum, M. H. (2004) Human research and data collection via the Internet. *Annual Review of Psychology,* 55, 803-832.

Brandtstädter, J. (1989). Personal self-regulation of development: Cross-sequential analyses of development-related control beliefs and emotions. *Developmental Psychology, 25*, 96-108. doi: 10.1037/0012-1649.25.1.96

Brandtstädter, J. (1990). Entwicklung im Lebenslauf. *Kölner Zeitschrift für Soziologie und Sozialpsychologie, 31*, 322-350.

Brandtstädter, J., & Greve, W. (1994). The aging self: Stabilizing and protective processes. *Developmental Review, 14*, 52-80. doi: 10.1006/drev.1994.1003

Brandtstädter, J. & Rothermund, K. (1994). Self-percepts of control in middle and later adulthood: Buffering losses by rescaling goals. *Psychology and Aging*, *9*, 265-273. doi: 10.1037/0882-7974.9.2.265

Buunk, B. P., Collins, R. L., Taylor, S. E., VanYperen, N. W, & Dakof, G. A. (1990). The affective consequences of social comparison: Either direction has its ups and downs.

Journal of Personality and Social Psychology. Vol.59, 1238-1249. doi: 10.1037/0022-3514.59.6.1238

Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist, 54*, 165-181. doi: 10.1037/0003-066X.54.3.165

Carstensen, L. L. & Turk-Charles (1994). The salience of emotion across the adult life span. *Psychology & Aging,* 2, 259-264. doi: 10.1037/0882-7974.9.2.259

Cottle, T. J. (1976). *Perceiving time: A psychological investigation with men and women.* New York: Wiley-Interscience.

Diehl, M. K., & Wahl, H.-W. (2010) Awareness of age-related change: Examination of a (mostly) unexplored concept. *The Journals of Gerontology, Series B: Psychological Sciences, 65B*, 340-350. doi: 10.1093/geronb/gbp110

Fleeson, W., & Heckhausen, J. (1997). More or less "me" in past, present, and future: Perceived lifetime personality during adulthood. *Psychology & Aging, 12*, 125-136. doi: 10.1037/0882-7974.12.1.125

Freund, A. M. (2007). Differentiating and integrating levels of goal representation: A life-span perspective. In B. R. Little, K. Samela-Aro, J. E. Nurmi & S. D. Philips (Eds.), *Personal project pursuit: Goals, action and human flourishing* (pp. 247-270). Mahwah, NJ: Erlbaum.

Freund, A. M., & Riediger, M. (2003). Successful aging. In R. M. Lerner, M. A. Easterbrooks, & J. Mistry (Eds.), *Handbook of psychology: Vol. 6. Developmental psychology* (pp. 601-628). Hoboken, NJ: Wiley.

Freund, A. M., & Smith, J. (1999). Content and function of the self-definition in old and very old age. *The Journals of Gerontology, Series B: Psychological Sciences, 54*, 55-67. doi: 10.1093/geronb/54B.1.P55

Gluth. S., Ebner, N. C., & Schmiedek, F. (2010). Attitudes towards younger and older adults: The German aging semantic differential. *International Journal of Behavioral Development, 34*, 147-158. doi: 10.1177/0165025409350947

Grühn, D., Gilet, A.-L., Studer, J., & Labouvie-Vief, G. (2011). Age-relevance of person characteristics: Persons' beliefs about developmental change across the lifespan. *Developmental Psychology, 47*, 376-387. doi: 10.1037/a0021315

Heckhausen, J. (1990). Entwicklung im Erwachsenenalter aus der Sicht junger, mittelalter und alter Erwachsener. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie, 12*, 1-12.

Heckhausen, J. (1999). *Developmental regulation in adulthood: Age-normative and sociostructural constraints as adaptive challenges*. New York, NY: Cambridge University Press.

Heckhausen, J., & Brim, O. G. (1997). Perceived problems for self and others: Self-protection by social downgrading throughout adulthood. *Psychology & Aging, 12*, 610-619. doi: 10.1037/0882-7974.12.4.610

Heckhausen, J., Dixon, R. A., & Baltes, P. B. (1989). Gains and losses in development throughout adulthood as perceived by different adult age groups. *Developmental Psychology, 25*, 109-121. doi: 10.1037/0012-1649.25.1.109

Heckhausen, J., & Krueger, J. (1993). Developmental expectations for the self and most other people: Age grading in three functions of social comparison. *Developmental Psychology,*

29, 539-548. doi: 10.1037/0012-1649.29.3.539

Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theory of life-span development. *Psychological Review, 117*, 32-60. doi: 10.1037/a0017668

Hummert, M. L., Garstka, T., Shaner, J., & Strahm, S. (1994). Stereotypes of the elderly held by young, middle-aged, and elderly adults. *Journal of Gerontology, 49*, 240-249. doi: 10.1093/geronj/49.5.P240

Kornadt, A. E., & Rothermund, K. (2011a). Internalization of age stereotypes into the self-concept via future self-views: A general model and domain-specific differences. *Psychology and Aging*. doi: 10.1037/a0025110

Kornadt, A. E., & Rothermund, K. (2011b). Contexts of aging: assessing evaluative age stereotypes in different life domains. *The Journals of Gerontology, Series B: Psychological Sciences*, *66B*, 547-556. doi: 10.1093/geronb/gbr036

Kotter-Grühn, D., & Smith, J. (2011). When time is running out: Changes in positive future perception and their relationships to changes in well-being in old age. *Psychology & Aging, 26*, 381-387. doi: 10-.1037/a022223

Kunzmann, U. (2008). Differential age trajectories of positive and negative affect: Further evidence from the Berlin Aging Study. *The Journals of Gerontology, Series B: Psychological Sciences, 63B*, 261-P270.

Lachman, M. E., & Firth, K. M. (2004). The adaptive value of feeling in control during midlife. In O. G. Brim, C. D. Ryff & R. Kessler (Eds.), *How healthy are we?: A national study of well-being at midlife* (pp. 320-349). Chicago: University of Chicago Press

Lang, F.R. (2001). Regulation of social relationships in later adulthood. *Journals of Gerontology, Series B: Psychological Science,* 56, P321-P326. doi:

10.1093/geronb/56.6.P321

Lang, F. R. & Heckhausen, J. (2001). Perceived control over development and subjective well-being: Differential benefits across adulthood. *Journal of Personality and Social Psychology*, *81*(3), 509-523. doi: 10.1037/0022-3514.81.3.509

Lang, F. R., Görlitz, D. & Seiwert, M. (1992). Altersposition und Beurteilungsperspektive als Faktoren laienpsychologischer Urteile über Entwicklung. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie*, *24*(4), 298-316.

Levy, B. R., Zonderman, A. B., Slade, M. D., & Ferrucci, L. (2009). Age stereotypes held earlier in life predict cardiovascular events in later life. *Psychological Science, 20*, 299-308. doi: 10.1111/j.1467-9280.2009.02298.x

Little, B. R. (1999). Personal projects and social ecology: Themes and variation across the life span. *Action & self-development: Theory and research through the life span* (pp. 197–221). Thousand Oaks, CA: Sage.

Luo, L. & Craik, F. I. M. (2009). Age differences in recollection: Specificity effects at retrieval. *Journal of Memory and Language*, *60*, 421-436. doi: 10.1016/j.jml.2009.01.005

McFarland, C., Ross, M., & Giltrow, M. (1992). Biased recollections in older adults: The role of implicit theories of aging. *Journal of Personality & Social Psychology, 62*, 837-850. doi: 10.1037/0022-3514.62.5.837

Mock, S. E., & Eibach, R. P. (in press). Aging attitudes moderate the effect of subjective age on psychological well-being: Evidence from a 10-year longitudinal study. *Psychology and Aging*. 10.1037/a0023877

Moser, C., Spagnoli, J., & Santos-Eggimann, B. (2011). Self-perception of aging and vulnerability to adverse outcomes at the age of 65–70 years. *The Journals of*

Gerontology, Series B: Psychological Sciences. doi: 10.1093/geronb/gbr052

Neugarten, B. L., Moore, J. W., & Lowe, J. C. (1965). Age norms, age constraints, and adult socialization. *American Journal of Sociology, 70*, 710-717.

Reips, U. (2011). Internet-based studies. In Marc D. Gellman, J. Rick Turner (Eds.) *Encyclopedia of Behavioral Medicine*. Berlin: Springer.

Röcke, C., & Lachmann, M. E. (2008). Perceived trajectories of life satisfaction: Profiles and correlates of subjective change in young, middle-aged, and older adults. *Psychology & Aging, 23*(4), 833-847. doi: 10.1037/a0013680

Rothbaum, F. (1983). Aging and age stereotypes. *Social Cognition*, 2, 171-184.

Rothermund, K. & Brandtstädter, J. (2003). Age stereotypes, self- views, and well-being in later life: Evaluating rival assumptions. *International Journal of Behavioral Development*, 27, 549-554. doi: 10.1080/01650250344000208

Ryff, C. D. (1991). Possible selves in adulthood and old age: A tale of shifting horizons. *Psychology & Aging, 6*, 286-295. doi: 10.1037/0882-7974.6.2.286

Rothermund, K. & Brandtstädter, J. (2003). Depression in later life: Cross-sequential patterns and possible determinants. *Psychology & Aging, 18,* 80-90. doi: 10.1037/0882-7974.18.1.80

Schaie, K. W. (1965). A general model for the study of developmental problems. *Psychological Bulletin, 64*, 92-107.

Staudinger, U. M., Bluck, S., & Herzberg, P. Y. (2003). Looking back and looking ahead: Adult age differences in consistency of diachronous ratings of subjective well-being. *Psychology & Aging, 18*, 13-24. doi: 10.1037/0882-7974.18.1.13

Thomae, H. (1989). Changes of time perspective in later adulthood. *Zeitschrift fur Gerontologie,*

22, 58-66.

Weiss, D. & Lang, F. R. (2012). «They» Are Old but «I» Feel Younger: Age Group Dissociation as a Self-Protective Strategy in Old Age. *Psychology and Aging, 27*, 153-163. doi: 10.1037/a0024887

Wilson, R. S., Beck, T. L., Bienias, J.L., & Bennett, D. A. (2007). Terminal cognitive decline: Accelerated loss of cognition in the last years of life. *Psychosomatic Medicine, 69*, 131–137. doi:10.1097/PSY.0b013e31803130ae.

Wilson, A. E., & Ross, M. (2001). From chump to champ: People's appraisals of their earlier and present selves. *Journal of Personality & Social Psychology, 80*, 572-584. doi: 10.1037//0022-3514.80.4.572

Wurm, S., Tesch-Römer, C., & Tomasik, M. J. (2007). Longitudinal findings on aging-related cognitions, control beliefs and health in later life. *The Journals of Gerontology, Series B: Psychological Sciences*, 62B, 156-164.

Table 1

Study 1: Regression Analyses Predicting Domain-Specific Perceived Controllability of Change From Perceived Change in Subjective Well-Being, Social Relations, Cognitive, and Physical Functioning (Negative Scores Indicate Decline, Positive Scores Indicate Growth)

	Perceived Controllability of Change in the Domain of			
	Subj. Well-Being[1]	Social Relations[2]	Cognition[3]	Physical Functioning[4]
Predictors	*β*	*β*	*β*	*β*
Age	-.08	-.18*	-.03	-.27**
Gender	-.07	-.08	-.06	-.04
Education	-.05	.10	.08	.08
General Control	.02	.17*	-.05	.05
Change in Subj. Well-Being	.18*	.21*	.24**	.17*
Change in Social Relations	-.06	.01	-.05	.05
Change in Cognition	.15*	.06	.10	.10
Change in Physical Function.	.07	.02	-.05	-.08

Note.[1] $R^2 = .12$, $SE = 22.92$, $F(8, 246) = 4.22$, $p < .001$.

[2] $R^2 = .14$, $SE = 23.10$, $F(8, 246) = 5.23$, $p < .001$.

[3] $R^2 = .10$, $SE = 17.87$, $F(8, 246) = 3.29$, $p < .001$.

[4] $R^2 = .20$, $SE = 16.50$, $F(8, 246) = 7.60$, $p < .001$.

Table 2

Study 2: Pairwise T-Tests[4] of Domain Differences in Developmental Self-Age Group and Self-Ideal Comparisons by Age Group

	Subj. Well-Being		Social Relations		Cognition	
Comparison	Age Group	Ideal	Age Group	Ideal	Age Group	Ideal
			Young Adults[1]			
Subj. Well-Being						
Social Relations	2.78	-.71				
Cognition	-3.20	-5.68**	-.99	-6.61**		
Physical Functioning	3.43*	4.47**	1.60	5.60**	.054	-2.18
			Middle-Aged Adults[2]			
Subj. Well-Being						
Social Relations	2.59	-.24				
Cognition	-2.99	-4.04*	-.46	-4.04*		
Physical Functioning	3.25	.66	.77	.422	.26	-3.46*
			Older Adults[3]			
Subj. Well-Being						
Social Relations	-.39	-.33				
Cognition	-.79	-1.73	-.87	-1.61		
Physical Functioning	1.45	-.177	1.80	.134	.69	-2.32

*$p < .0013$, **$p \leq .000$.

Note [1] *dfs*= 76,77.

[2] *dfs* = 51, 52, 53.

[3] *dfs* = 33, 34.

[4] Bonferroni-adjusted.

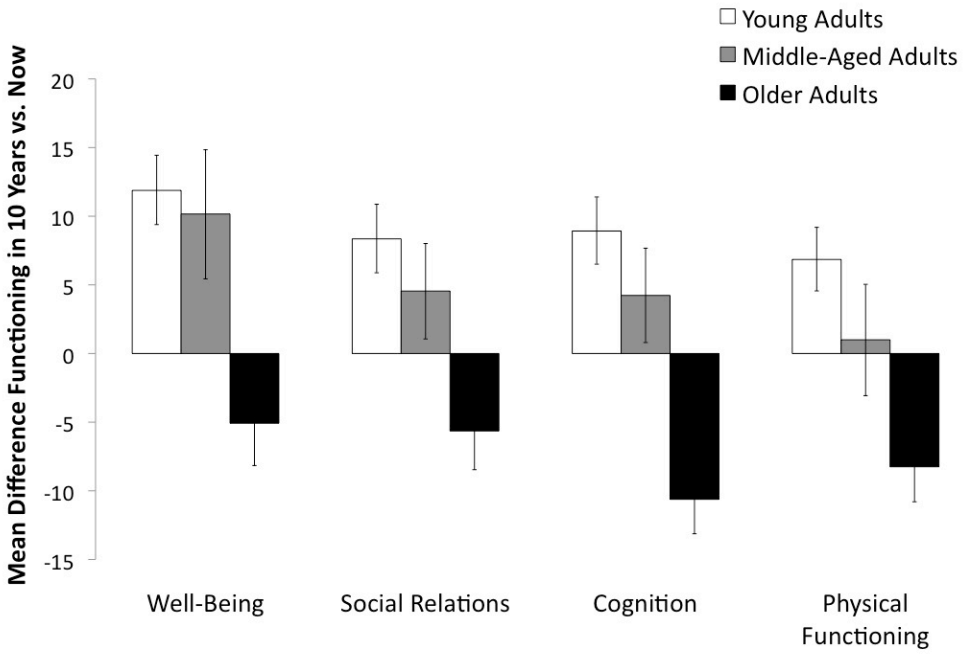


Figure 1. Mean difference values (scale range 0 to 100%) representing the self-rated functioning *now* subtracted from the self-rated functioning *in 10 years*. There are two significant main effects and no significant interaction. Error bars represent confidence intervals.

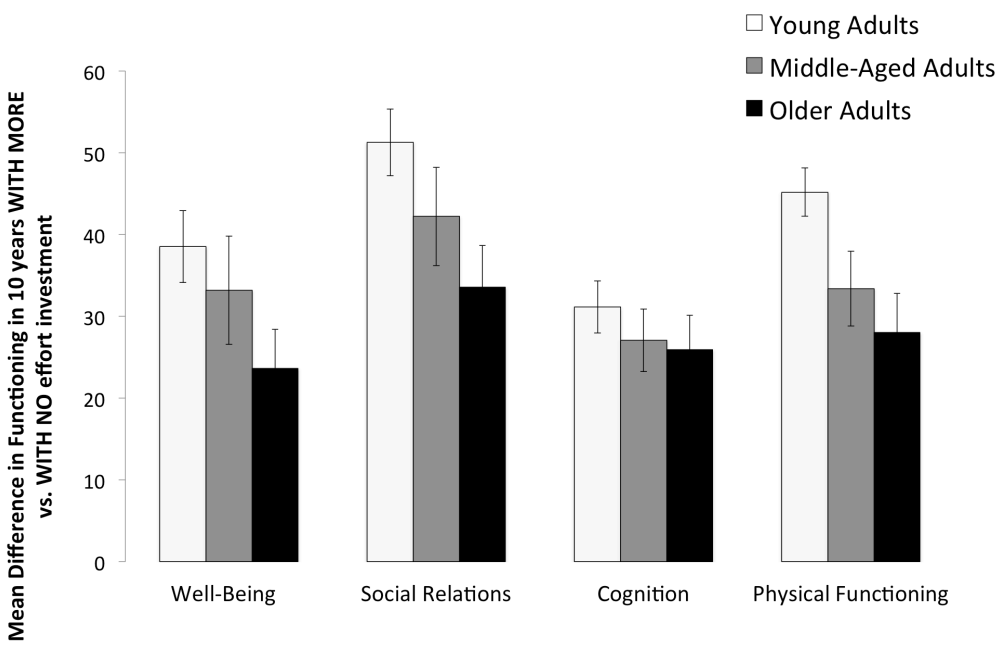


Figure 2. Mean difference values (scale range 0 to 100%) representing the self-rated functioning in 10 years *with effort investment* subtracted from the self-rated functioning in 10 years *without effort investment*. There are two significant main effects and a significant interaction. Error bars represent confidence intervals.

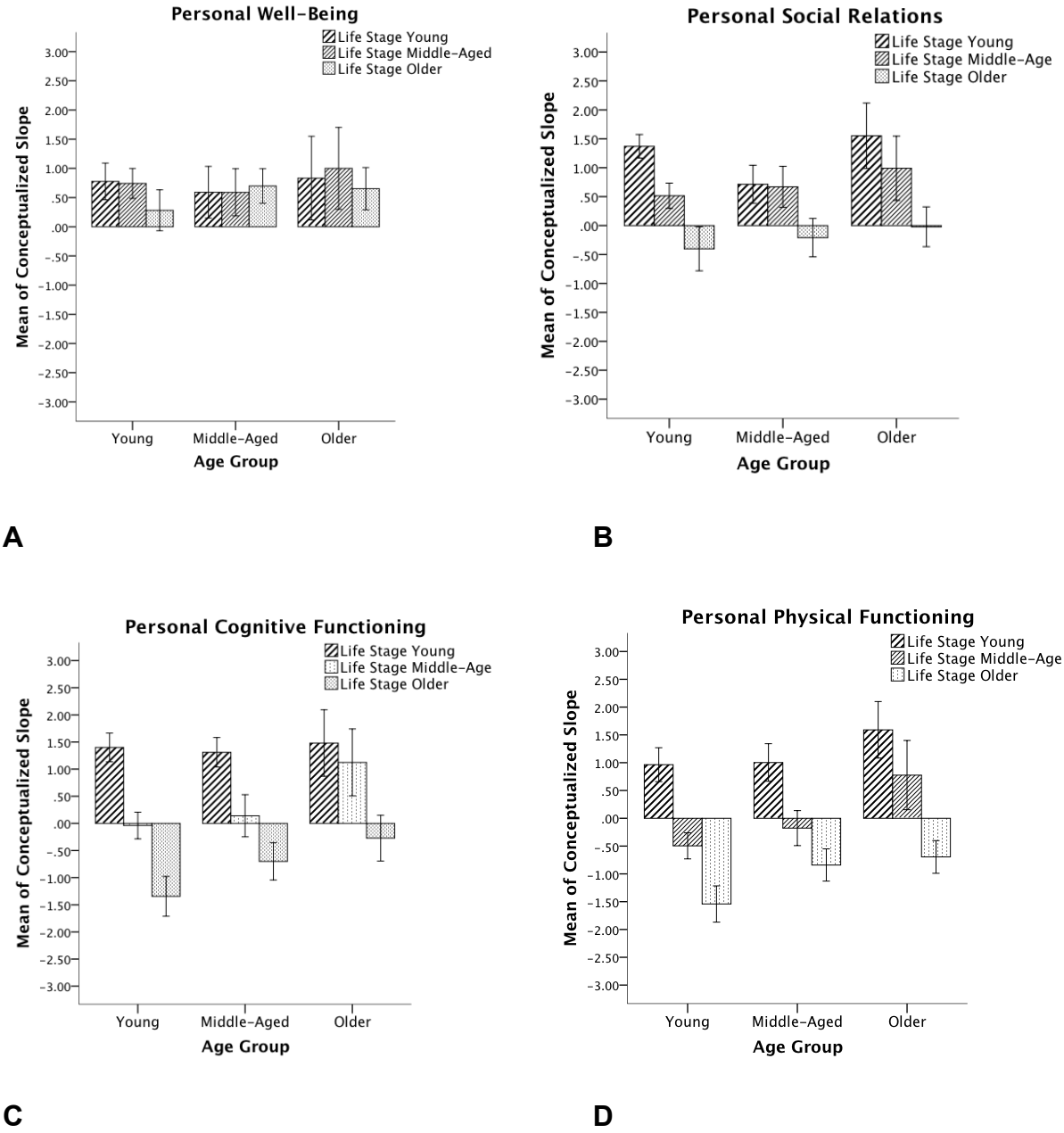


Figure 3. Mean slopes of drawings by three age groups for three life stages in the domains of (A) subjective well-being (B) social relations (C) cognition (D) physical functioning from the *self* perspective. Values above zero indicate that the particular life stage was associated with growth; values below zero indicate an association with decline. Error bars represent confidence intervals.

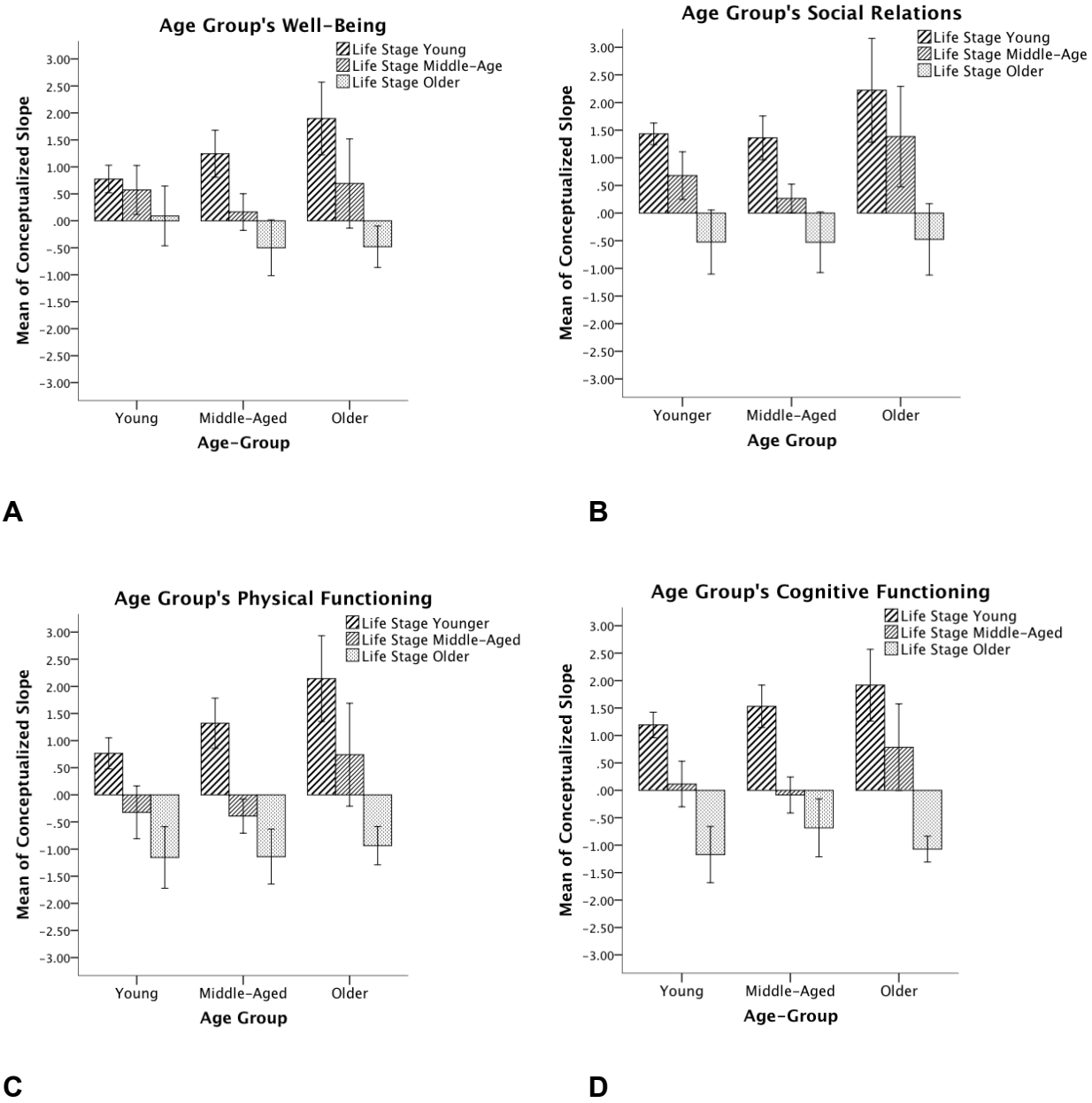


Figure 4. Mean slopes of drawings by three age groups for three life stages in the domains of (A) subjective well-being (B) social relations (C) cognition (D) physical functioning from the *one's age group* perspective. Values above zero indicate that the particular life stage was associated with growth; values below zero indicate an association with decline. Error bars represent confidence intervals.

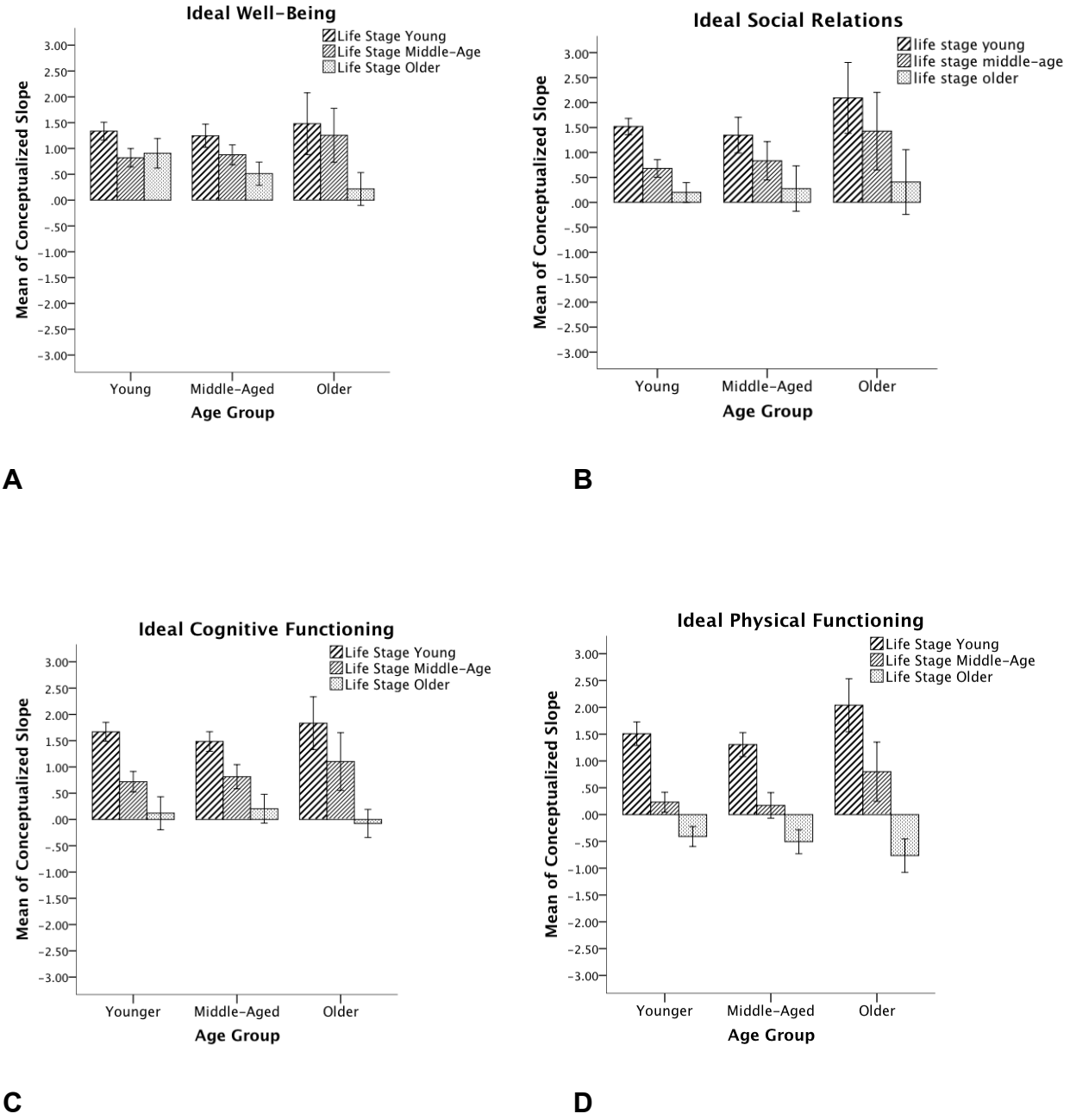


Figure 5. Mean slopes of drawings by three age groups for three life stages in the domains of (A) subjective well-being (B) social relations (C) cognition (D) physical functioning from the *ideal* perspective. Values above zero indicate that the particular life stage was associated with growth; values below zero indicate an association with decline. Error bars represent confidence intervals.

Supplemental Materials

Appendix A

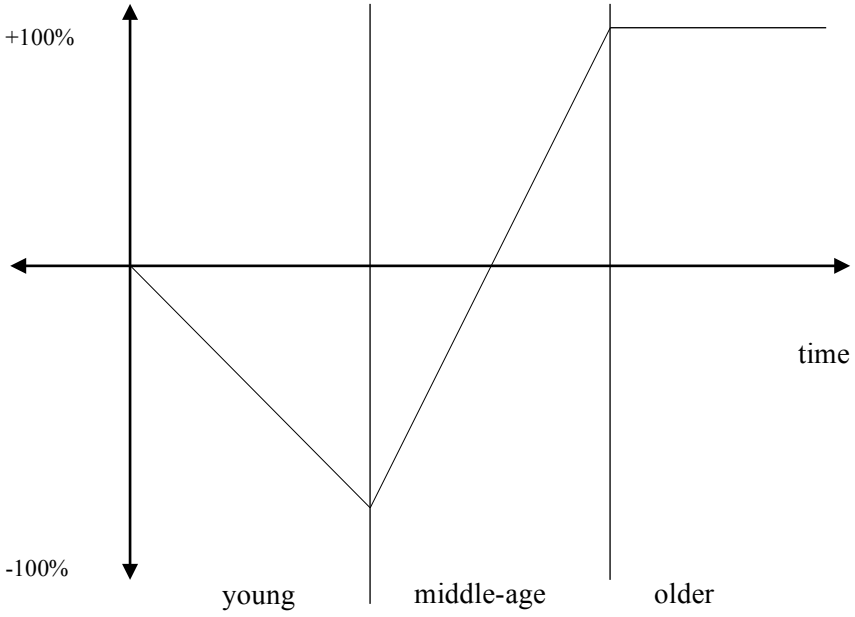
Verbatim Description of the Instructions Used in Study 2

Personal Development

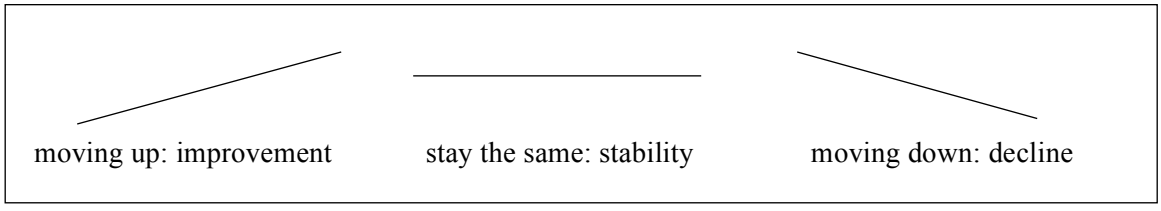
The development of different abilities can **improve**, **decline**, or **stay the same** over time. We can plot how our abilities change over time in a graph. The following example shows how someone's ability to manage time might develop. The graph begins at age 18. Starting there, this ability can either stay the same, improve, or decline.

Example: Ability to manage time

In early adulthood, the ability to manage time might decline. This ability might improve during middle adulthood and then stay on the same level during later adulthood.



The development of the ability to manage time was depicted using the following lines:



On the following pages, please draw lines like these to show your personal development in different areas (namely, cognitive functioning, well-being, physical functioning, and social relationships). We

are interested in seeing which direction you draw these lines in. There are no "correct" or "incorrect" drawings.

Your Personal Development

Now please draw a line to show **your personal** development, moving up to show improvement, staying at the same level to show stability, or moving down to show decline. (*A blank axis of abscissas appeared after each domain description*).

Subjective Well-Being

"Well-being" refers to a general feeling of being content with yourself and your life. What do you think – how has your well-being developed up to now and how will it be in future?

Social Relationships

"Social relationships" refer to the quality and quantity of social relationships. What do you think – how have your social relationships developed up to now and how will they be in future? Please draw a line to show your development in this area.

Cognitive Functioning

"Cognitive functioning" refers to abilities like memory and the ability to concentrate. What do you think – how has your cognitive functioning developed up to now and how will it be in future? Please draw a line to show your development in this area.

Physical Functioning

"Physical functioning" refers to abilities like physical endurance, power, and mobility. What do you think – how has your physical functioning developed up to now and how will it be in future? Please draw a line to show your development in this area.

Your Age Group's Development

Now please draw a line to show **your age group's** development, moving up to show improvement, staying at the same level to show stability, or moving down to show decline. (*A blank axis of abscissas appeared after each domain description*).

Subjective Well-Being

Social Relationships

Cognitive Functioning

Physical Functioning

Ideal Development

Now please draw a line to show **ideal** development, moving up to show improvement, staying at the same level to show stability, or moving down to show decline. (*A blank axis of abscissas appeared after each domain description*).

Subjective Well-Being

Social Relationships

Cognitive Functioning

Physical Functioning

Appendix B:

Difference scores between perceived self and ideal as well as self and one's age group development in (A) subjective well-being (B) social relations (C) cognition (D) physical function